



**Georgia-Pacific**

Big Island, VA

**Project XL**

**Full-Scale Steam Reformer**

**Black Liquor Gasification**

November 4, 1999

# Georgia-Pacific Facility Overview

- History
- Products
- Water Use

# Big Island Facility

- Paper production begun on site in 1891
- Non-sulfur, non-bleaching sodium carbonate semi-chemical mill
- In 1970s the mill developed and patented non-sulfur cooking process

# Big Island Facility

- G-P Big Island employs 380 people
- Market value is more than \$300 million
- Annual operating costs about \$175 million
- Products
  - 900 TPD corrugating medium from semi-chemical pulp/secondary fiber
  - 700 TPD linerboard from secondary fiber

# Water Use

- The mill uses approximately 4500 gallons of water to make 1 ton of pulp
- We treat about 7 million gallons per day of wastewater
- On an average, we discharge only 20% of our State permit limits for BOD and TSS
- We utilize the James River to help generate a portion of the electricity used at the mill

# Project Overview

- Regulatory Requirements
- Compliance Options
- Gasification
- Benefits

# Cluster Rule

- Federal regulation for paper industry
- Maximum Achievable Control Technology (MACT I and MACT II)
- Air and water emissions from:
  - Pulp Mills
  - Evaporation Units
  - Chemical Recovery Furnaces
- Big Island mainly affected by the air emission portions

# MACT I

- Became law in April 1998
- 3 years to comply
- Collect and treat emissions from Pulp Mill Operations and Evaporator systems
- Big Island will spend about \$10 million
  - Replace blow tank
  - Install evaporators
  - Install emissions collection system



# MACT II

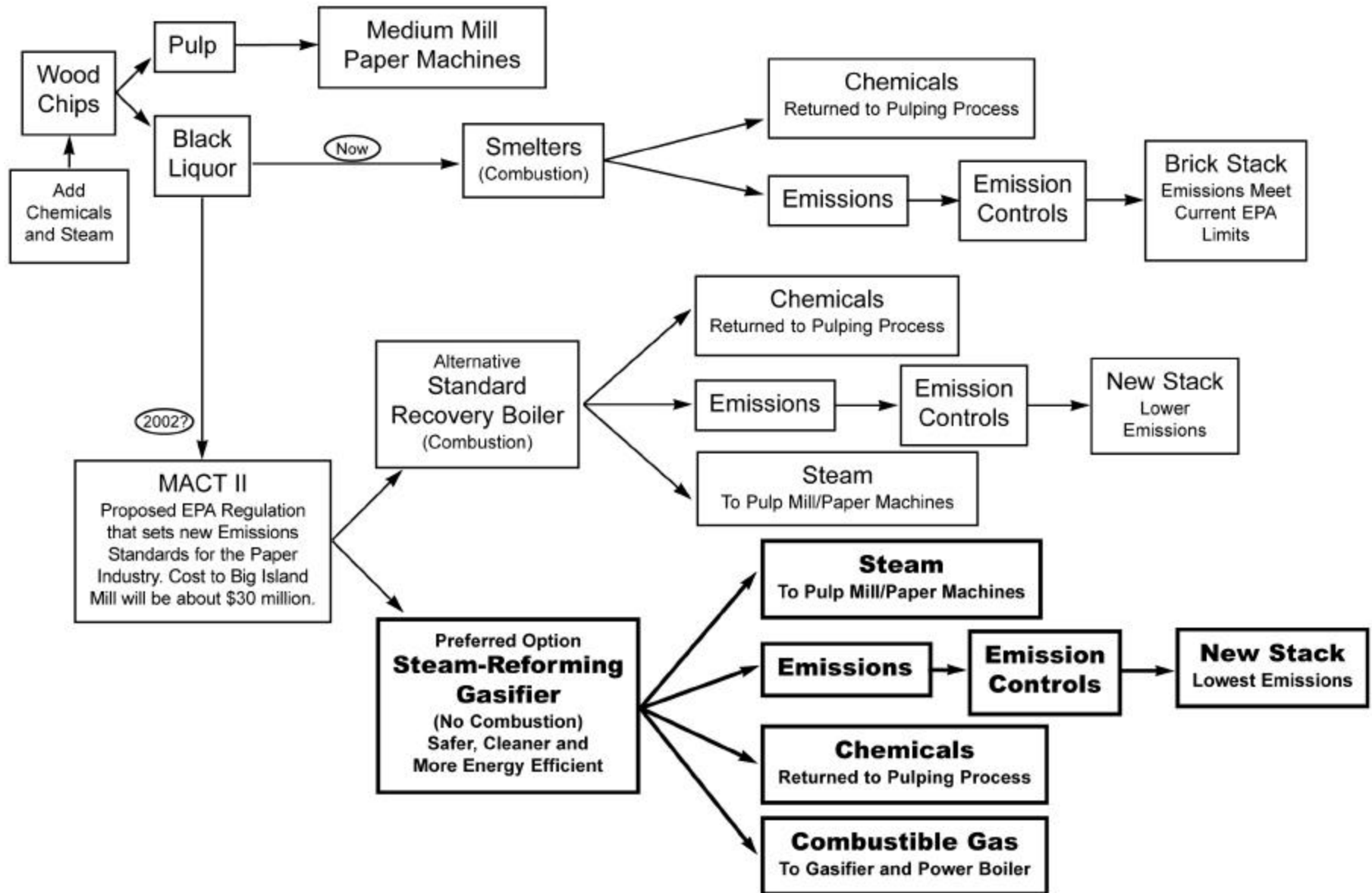
- MACT II regulations address chemical recovery combustion sources
- Final Rule promulgation date unknown
- Industry will have three years to comply

# MACT II

- Currently, spent pulp liquor is concentrated and burned in smelters
- Physical condition and efficiency of smelters require they be rebuilt or replaced
- Question: Replace with conventional recovery furnace or first full-scale demonstration gasification unit for industry in U.S.?

# BIG ISLAND MILL CHEMICAL RECOVERY PROCESS

## CURRENT AND PROPOSED



# What is Gasification?

- Conversion of organics to a combustible gas

*Heat + Organics = Combustible Gas*

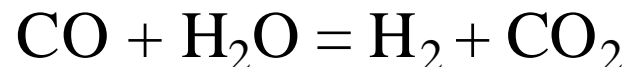
# What is...

## Spent Liquor Steam Reforming?

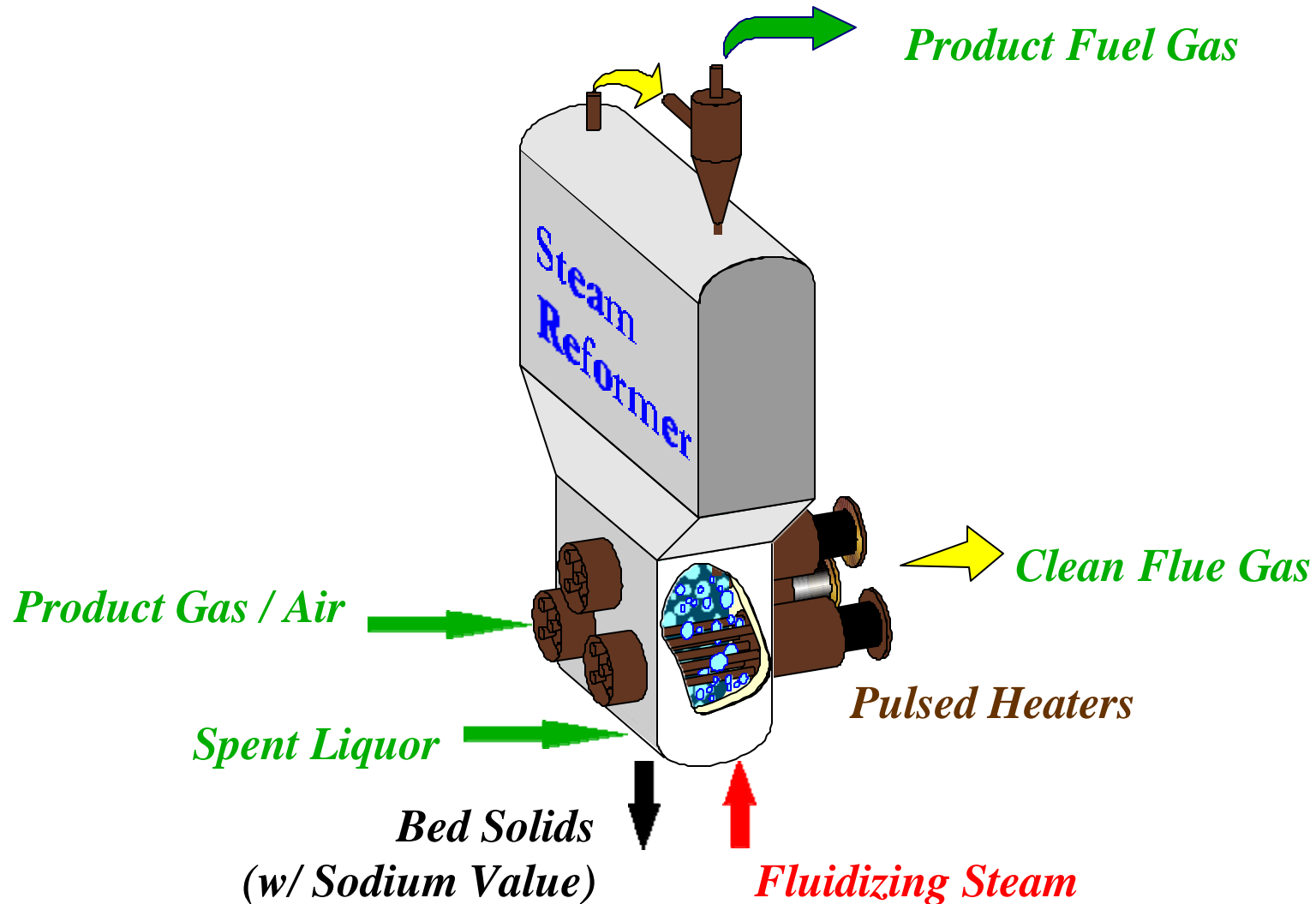
- Medium temperature, atmospheric pressure exposure to steam in the absence of air or oxygen
- Organics are converted to hydrogen and carbon monoxide



- Carbon Monoxide reacts with steam to form more hydrogen and carbon dioxide



# StoneChem Steam Reformer



# Gasification Benefits

- Elimination of smelt-water explosion hazard
- Increased efficiency in energy conversion and chemical recovery compared to smelters
- Steam-Reformer process is self-sustaining
- Does not require auxiliary fossil fuel
- Possibly reduced operation/maintenance costs
- Lower emissions

# Gasification Benefits

## Emissions

	Smelters*		Recovery	Boiler**	Gasifier**	
	(tons/yr)	lbs/ton BLS***	(tons/yr)	lbs/ton BLS	(tons/yr)	lbs/ton BLS
NOx	142	4.99	90	2	25	1
SO2	11.8	0.41	11	0.30	1	0.04
CO	6,284	220.72	146	4.00	15	0.41
VOC	1,363	47.87	7.5	0.21	0.4	0.01
Particulate	363	12.75	15	0.41	8	0.22
* Average annual emissions 1997-1998						
** Based on current average maximum production capacity of the Pulp mill						
*** BLS - Black Liquor Solids						



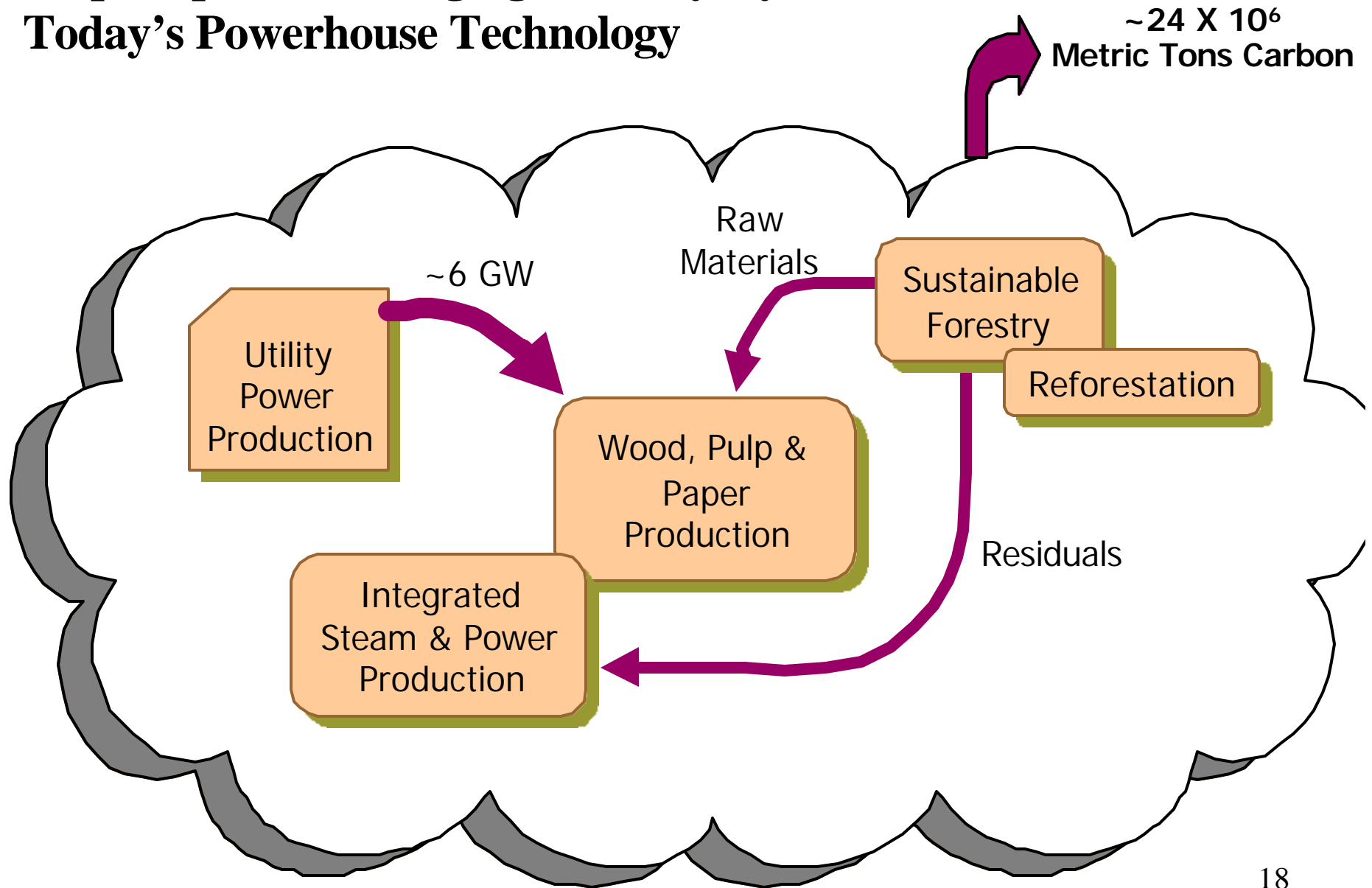
# Gasification Benefits

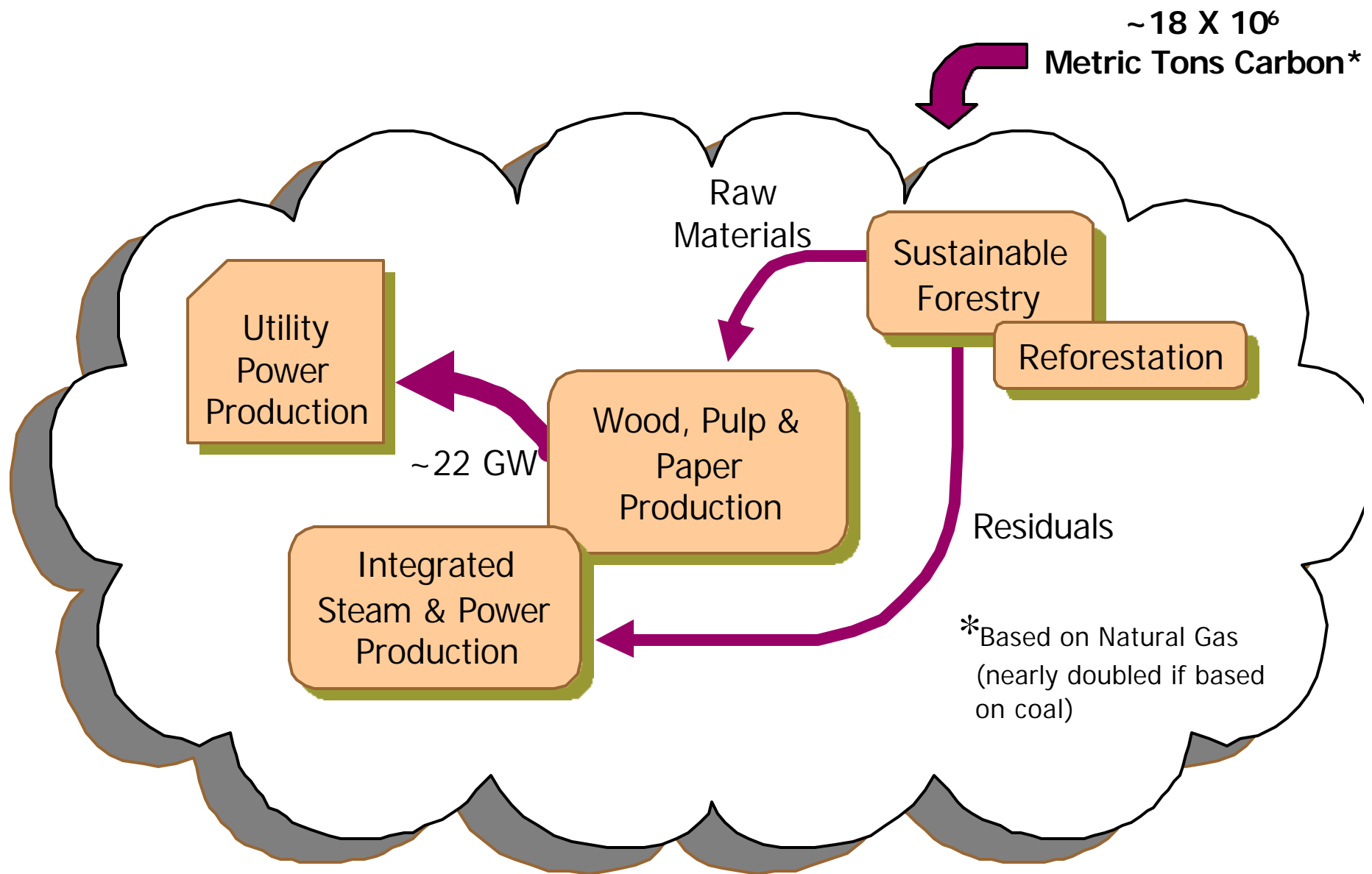
## Energy

- Higher energy conversion rate than smelters
- Department of Energy has committed to help with funding of the engineering phase of the project.
- Gasification technology applied to all black liquor recovery and biomass, with combined cycle technology would create a net export of electrical energy.

# Pulp, Paper & Packaging Industry Cycle

## Today's Powerhouse Technology





## Pulp, Paper & Packaging Industry Cycle – Total Replacement with Gasification Combined Cycle Technology

# Gasification Risks

- No full-scale Steam-Reforming Gasification Units
- If the Unit requires extensive “de-bugging,” additional time will be needed before we are “regulated”
- If the unit fails we will need additional time to replace with conventional technology

# EPA's Project XL

- Created by the USEPA ... “to give companies and communities the opportunity to propose new ways of complying with environmental laws that help the environment by doing things cleaner, cheaper, and smarter.”

# Project XL Criteria

- Superior Environmental Performance
- Innovation/Pollution Prevention
- Transferability
- Feasibility
- Evaluation, Monitoring, and Accountability
- Shifting of Risk Burden
- Stakeholder Involvement

# Requested Flexibility

- Reformer requires extra compliance time to insure that all “bugs” are worked out and in the unlikely event that the technology fails
- Establishing a “safety net” up-front will be a major factor in decision to go with reformer or conventional recovery furnace
- Ability to use Gasifier generated steam in place of Natural gas generated steam

# XL Meetings/Presentations

- Met with the EPA to discuss the project and Project XL on Jan. 19, 1999
- Made presentations of the project to the following groups:
  - Southern Environmental Law Center (2/18/99)
  - Virginia Chapter of the Sierra Club (2/18/99)
  - Virginia Department of Environmental Quality (2/19/99)



# XL Meetings/Presentations

- Presentations (continued)
  - Forest Service (Federal Land Manager Representative) (2/19/99)
  - Big Island Salaried Personnel (2/23/99)
  - Big Island Community (2/25/99)
  - Big Island Union Executive Board (3/4/99)
  - Local government/business leaders (3/18/99)
  - Community Meeting (11/03/99)